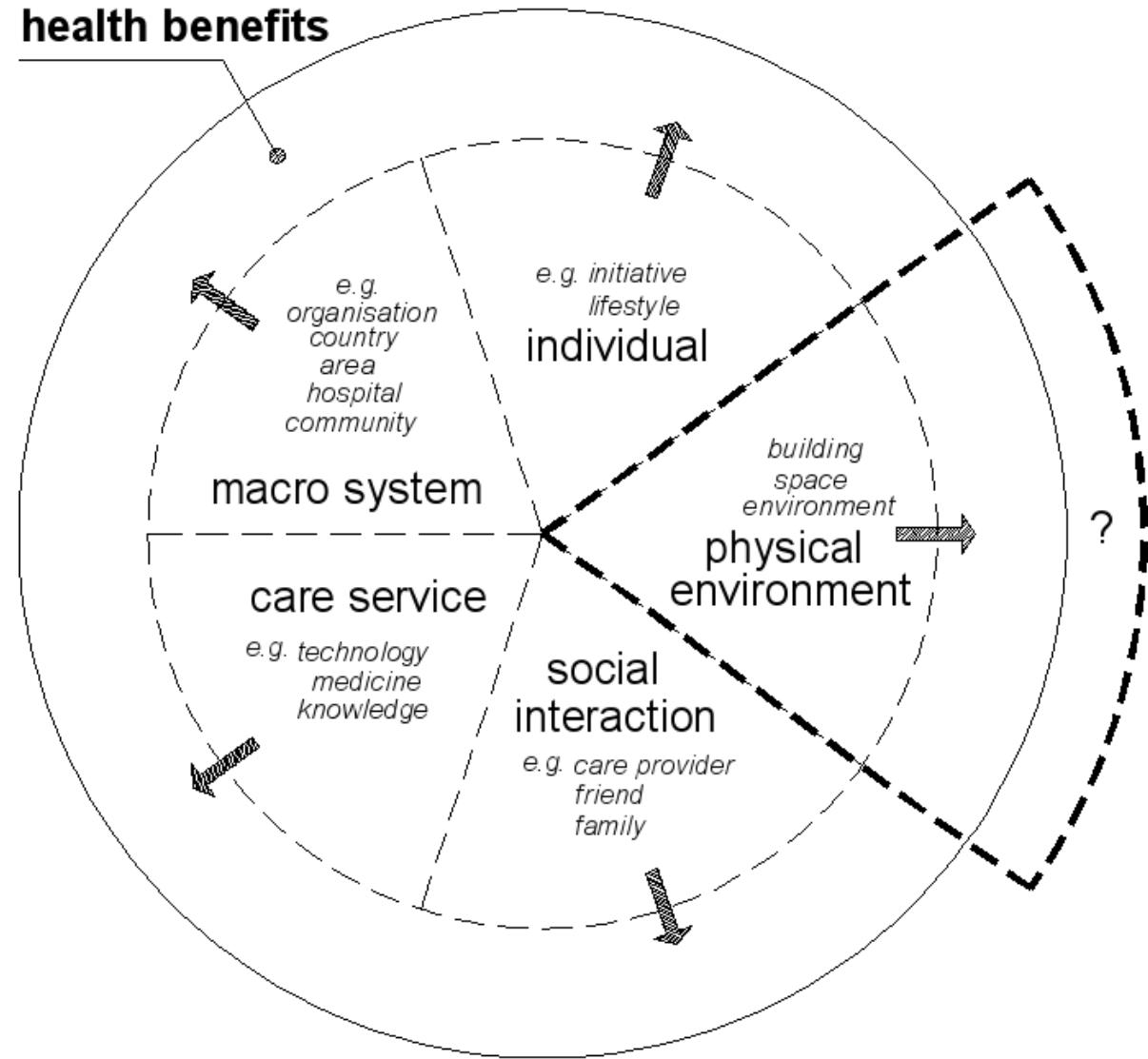


Interaction affecting the  
achievement of healing built  
environment: time to take a  
holistic consideration



# Research area

The GOAL is to provide the means by which the contribution of the physical built environment to health outcomes can be quantified and apportioned independently and in combination to other factors.



# What we know...

**Negative impact:** if only *ONE* single environmental factor is at an unacceptable level, the occupants' comfort and health outcome will be severely compromised no matter how high the quality of other factors are.



e.g. noise



overcrowding space



poor wayfinding

# What we also know...

**Positive impact:** a few rigorous study that e-factors have a positive impact come pretty close to the level of certainty and quantification.



e.g. sunlight



privacy



window views

# What we don't know ...

How well a **POSITIVE** environment from a holistic perspective (real building case) can contribute to the health benefit (real end users)?

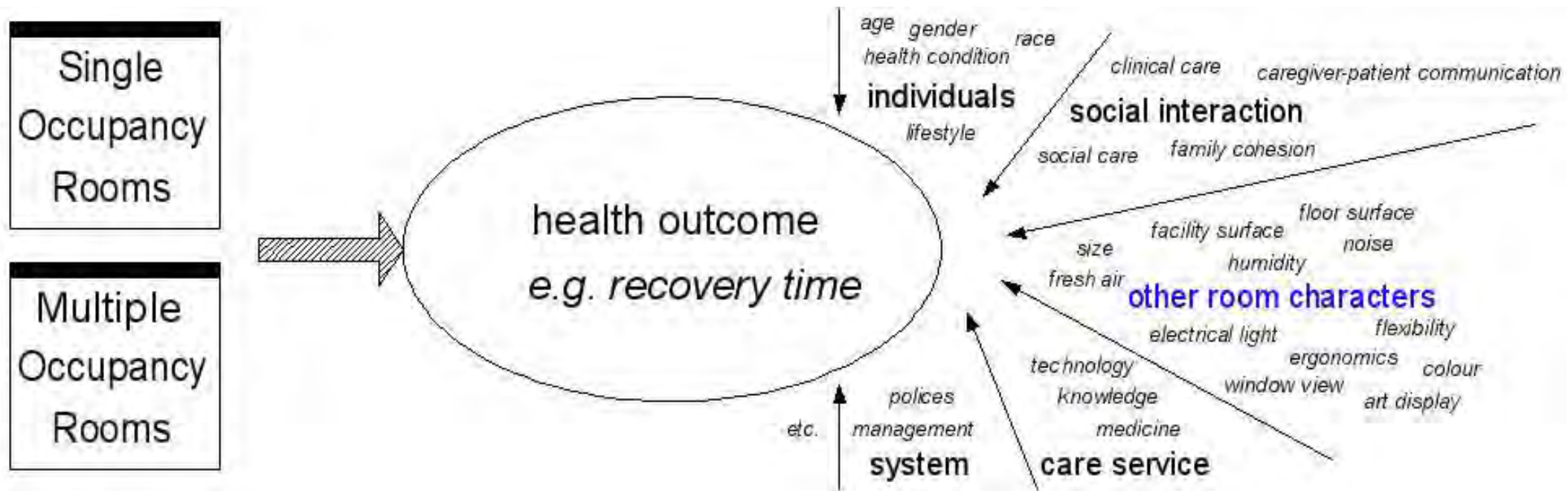
Is there any evidence for **DEMONSTRABLE** impacts of healthcare building design on the health outcome to the patients/ staff?



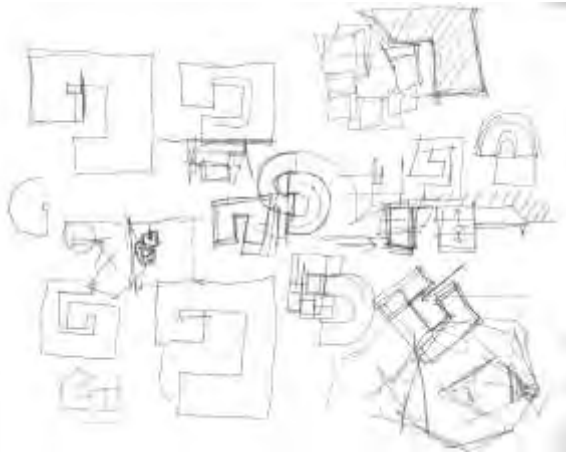
e.g. Debate on *(dis)advantages* of Single-Versus Multiple-Occupancy Rooms

# Why we don't know ...

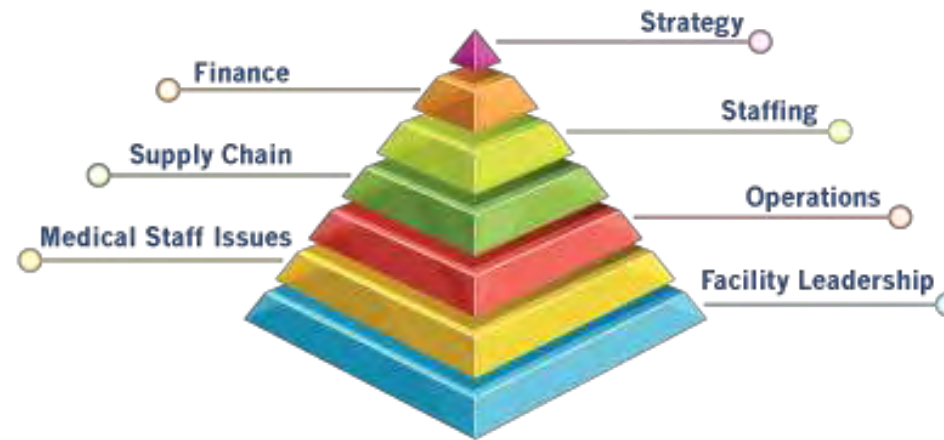
- There is a constant interplay between each factor;
- The interactive and correlated effect can not be ignored;
- The cumulative effects as a whole are far from thoroughly addressed.



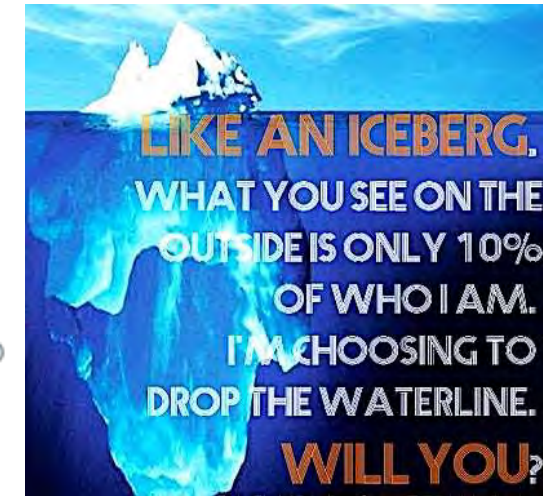
# Why we should know ...



e.g. Building Design (AEC industry)



hospital management

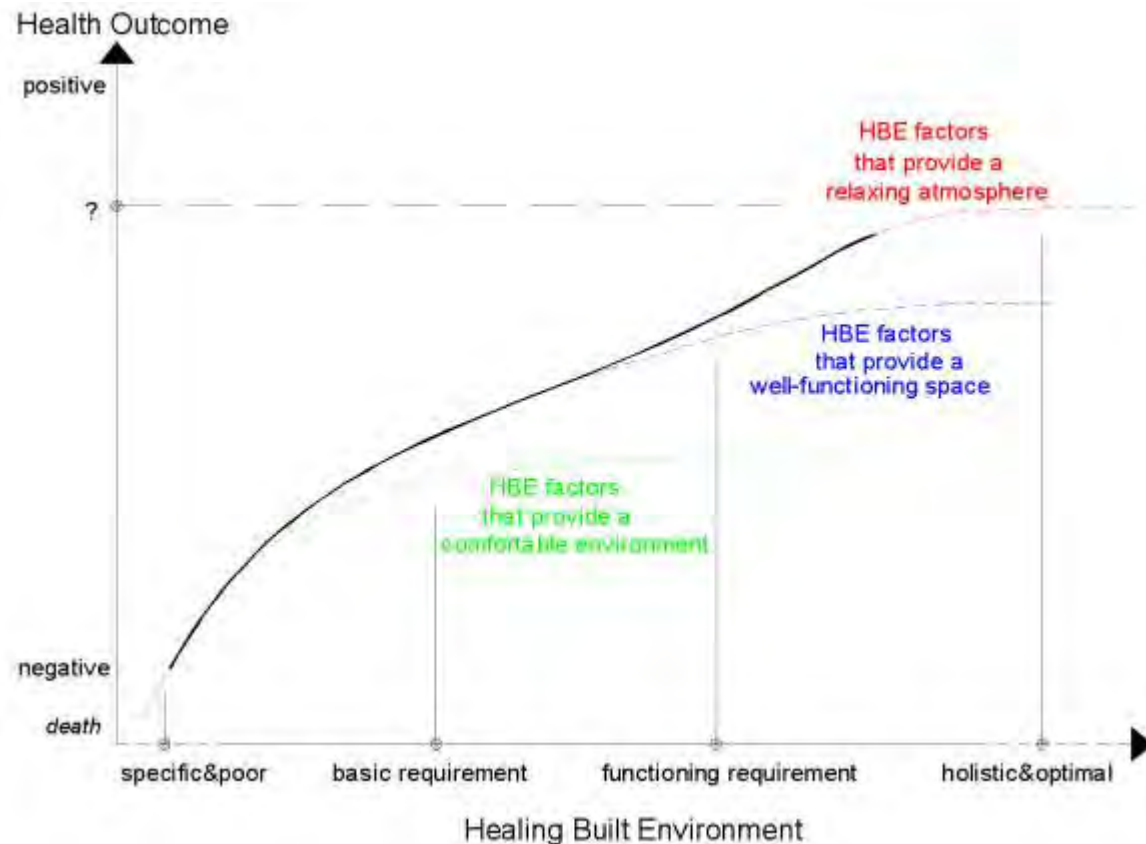


life-cycle cost

- What is the best design solution?
- What evidence can inform the stakeholders to locate the main resources to the most effective design solutions?

# How we propose to know ...

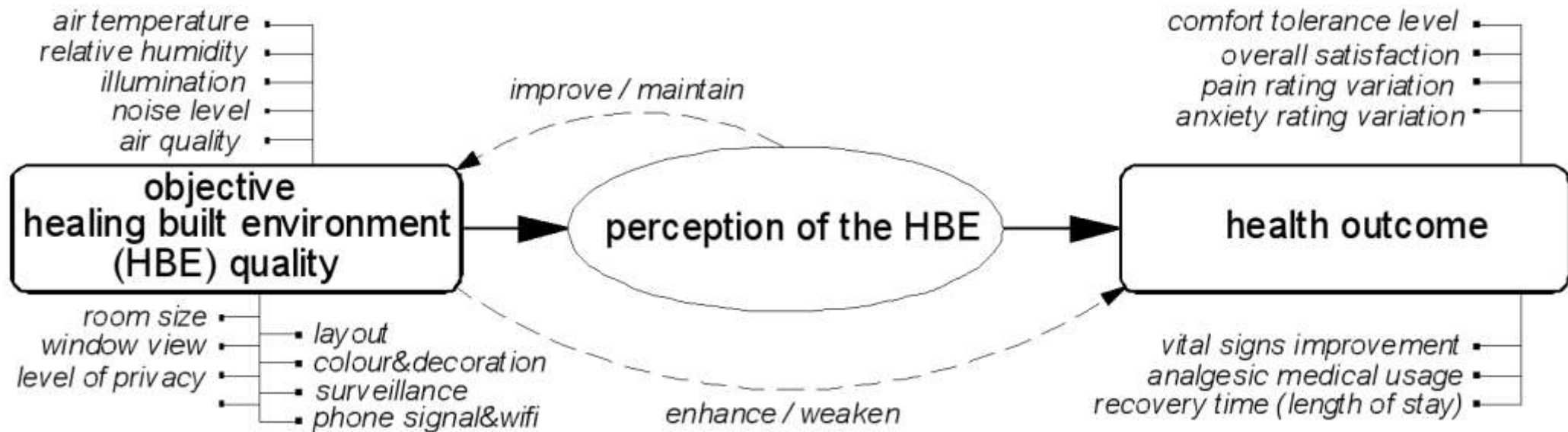
## A HOLISTIC view of optimizing the healing built environment for health benefit generation



- Bottom tier: HBE factors that provide a comfortable environment, including all basic requirements for any types of purpose-built environment
- Middle tier: HBE factors that provide a well-functioning space, including necessary priorities for a specific functioning environment, in this case, the healthcare building
- Top tier: HBE factors that provide a relaxing atmosphere, including appropriate sensory stimulation to reduce the stressful feelings, which can be seen as a targeted approach to the nature of healing environment



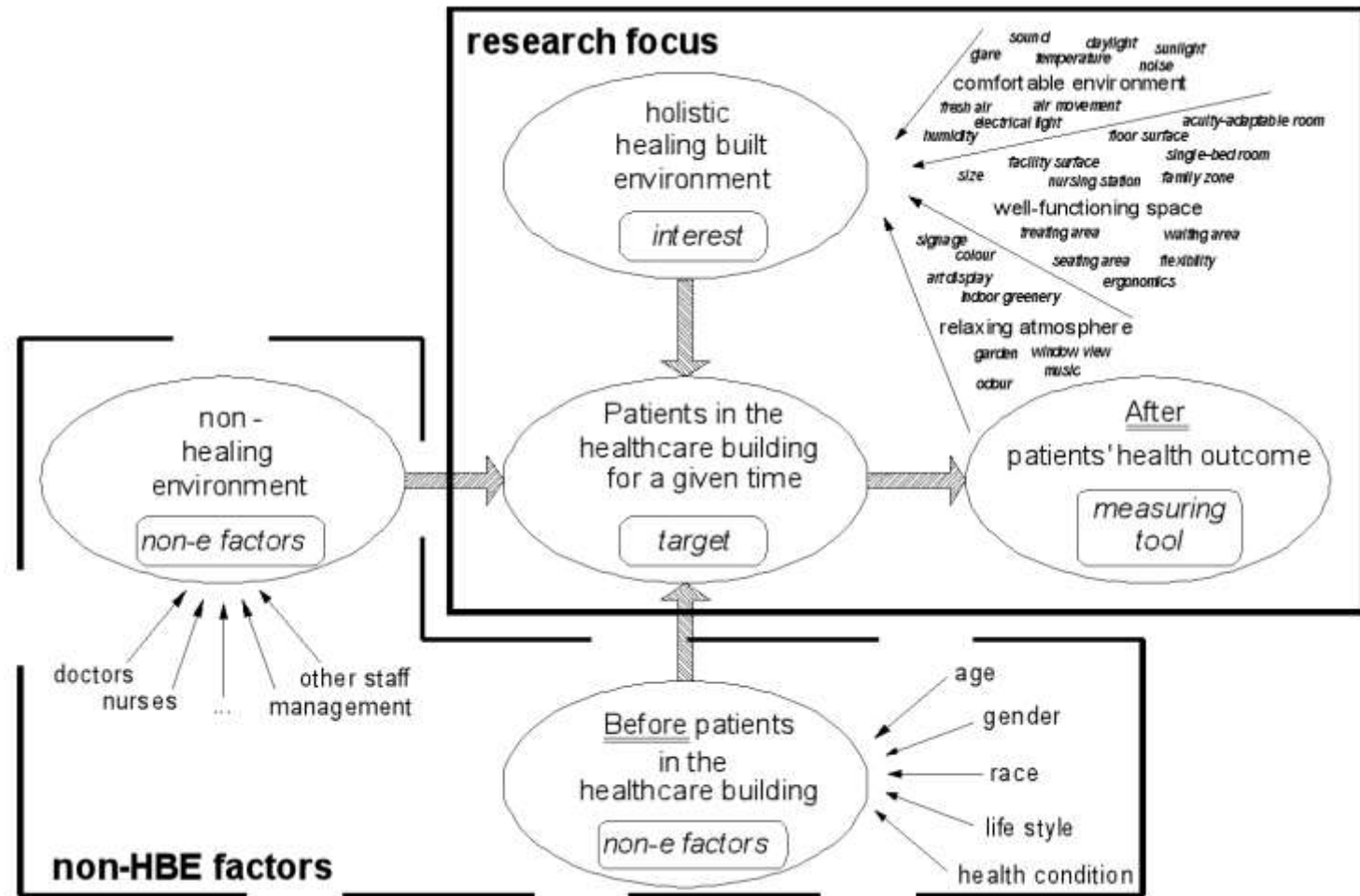
# Overview of the research design



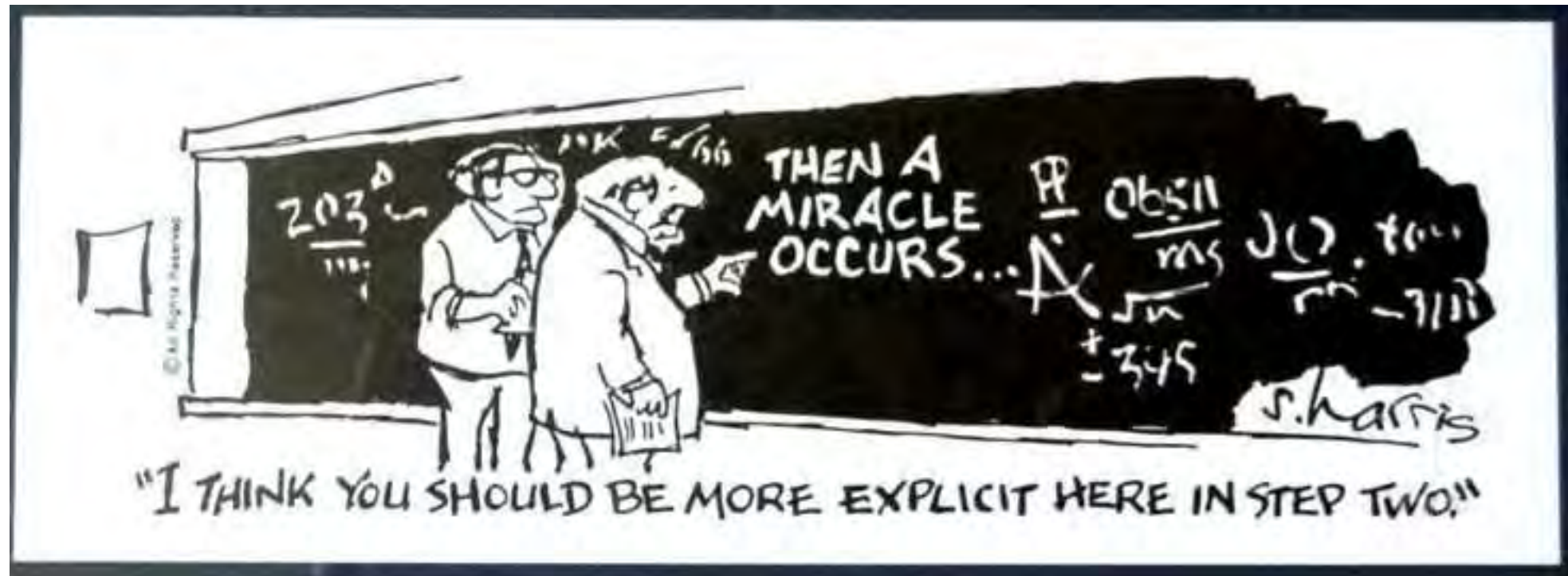
# Overview of the research design

Research focus:

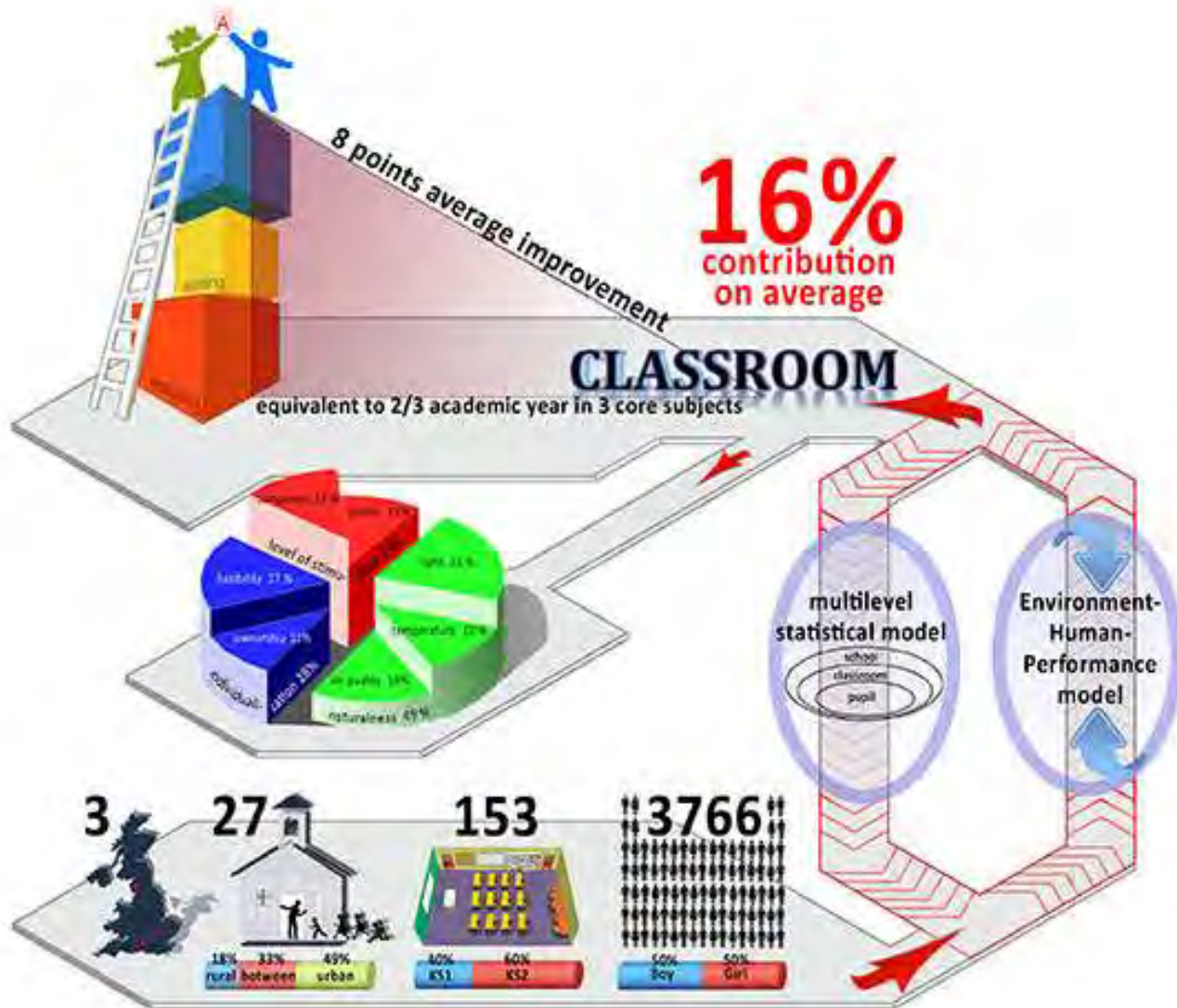
- a complete picture of the healing environment
- the daily use of the healing environment
- Non-environmental factors



We are still at the initial stage...



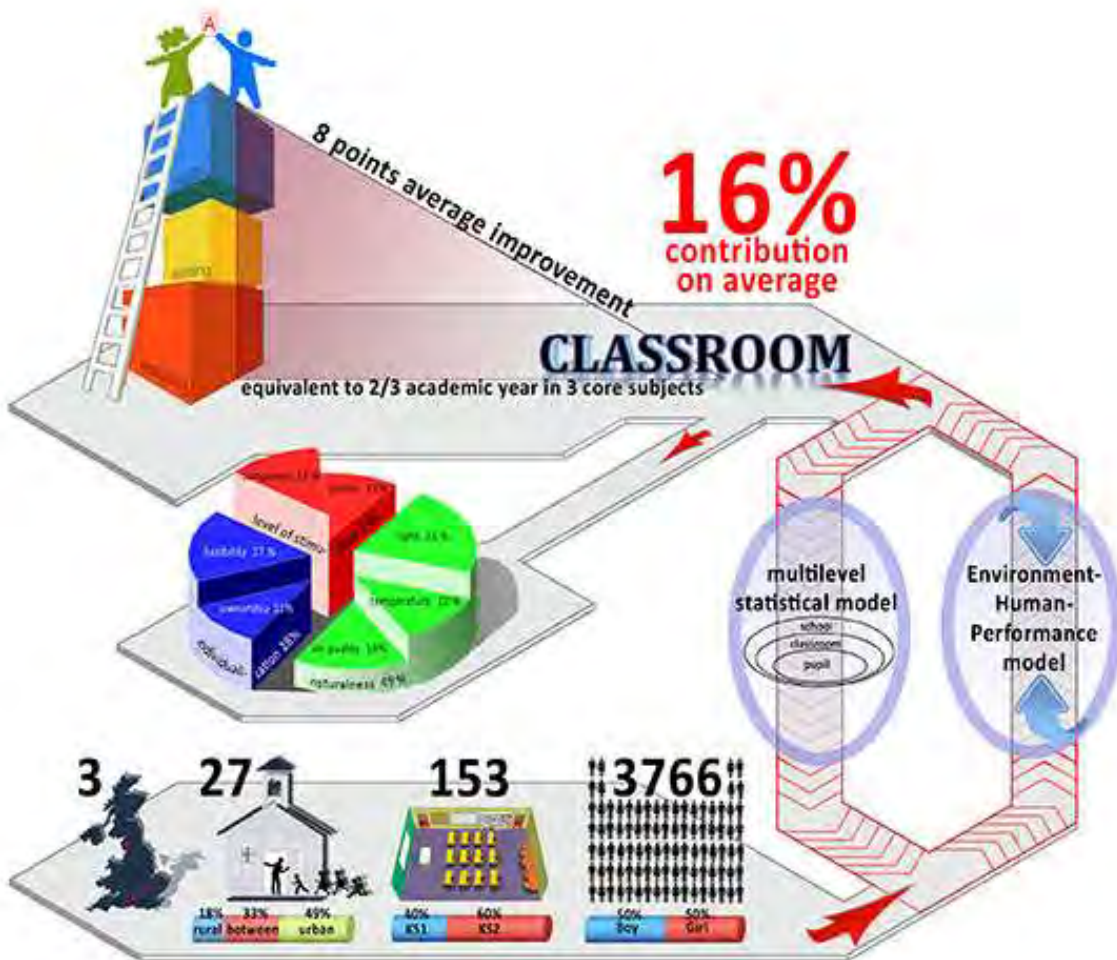
# Answers from schools and classrooms ...



Parameter estimates and standard errors for factors significant in the MLM.

Factors	Parameter estimate	Standard error	
Intercept	0.070	0.046	
Weighted Start	-0.348	0.046	
Weighted Start-on-age	0.090	0.037	
EAL	0.086	0.038	
FSM	-0.094	0.031	
SEN	-0.363	0.037	
Naturalness			
	Light	0.141	0.044
	Temperature	0.083	0.046
	Air quality	0.112	0.046
Individualization	Ownership	0.076	0.044
	Flexibility	0.115	0.046
Level of stimulation	Complexity	0.085	0.040
	Colour	0.074	0.043
Intercept variance		0.274	0.034
Weighted start-on-age variance		0.094	0.014
Covariance between intercept and weighted start-on-age		-0.067	0.016
Random error		0.454	0.011

# Good classroom features



The main classroom characteristics that support the improvement of pupils' learning.

Design parameter	Good classroom features
Light	Classroom towards the east and west can receive abundant daylight and have a low risk of glare. Oversize glazing has to be avoided especially when the room is towards the sun's path for most of year. Also, more electrical lighting with higher quality can provide a better visual environment.
Temperature	The classroom receives little sun heat or has adequate external shading devices. Also, radiator with a thermostat in each room gives pupils more opportunities to adapt themselves to the thermal environment.
Air quality	Large room volume with big window opening size at different heights can provide ventilation options for varying conditions.
Ownership <sup>a</sup>	Classroom that has distinct design characteristics; personalized display and high quality chairs and desks are more likely to provide a sense of ownership.
Flexibility	Larger, simpler areas for older children, but more varied plan shapes for younger pupils. Easy access to attached breakout space and widened corridor for pupils' storage. Well-defined learning zones that facilitate age-appropriate learning options, plus a big wall area for display.
Complexity <sup>a</sup>	The room layout, ceiling and display can catch the pupils' attention but in balance with a degree of order without cluttered and noisy feelings.
Colour <sup>a</sup>	White walls with a feature wall (highlighting with vivid and or light colour) produces a good level of stimulation. Bright colour on furniture and display are introduced as accents to the overall environment.

<sup>a</sup> Strongly usage-related classroom features.

THANK YOU!